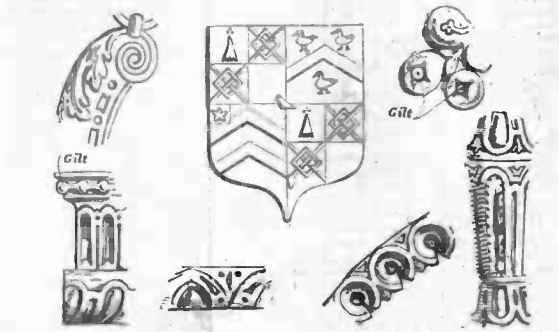
Elizabethan chair, I have had the honour of receiving a note respecting it from my friend, Mr. R. S. S. Warburton, of Arley Hall, Cheshire. He states, "that the coat of arms upon it were those borne by Sir Peter Warburton, knight, and to whom no doubt the chair belonged." Sir Peter was not knighted till some time subsequently to the inscribed date, 1603; he was one of the justices of the Court of King's Bench, purchased the manor of Grafton, in Cheshire, and erected the Hall of Grafton, now in existence; a view of it is given in "Ormerod's History of Cheshire," likewise in the small book, "Clarke's Elizabethan Architecture."

C. J. R.



ARMS AND OTHER DETAILS OF THE CHAIR.

PETRALOGY, OR THE KNOWLEDGE OF ROCKS AND STONES.

BY HENRY G. MONTAGUE, ESQ., PROFESSOR OF NATURAL PHILOSOPHY.

(*Continued from p. 267.*)

In the earliest epochs of civilization a knowledge of rocks was almost exclusively confined to the architect and sculptor, and the magnificent remains of former greatness testify that the ancients were not only well acquainted with the several varieties adapted to architecture and sculpture, but also with the localities where the materials most suited to their views were to be found, and with the conditions essential to their usefulness and durability. Little is left of Babylon commemorative of its former renown and greatness, and the little that is left denotes the more extensive use of sun-burnt bricks than the treasures of the quarry so lavishly bestowed on the perhaps equally celebrated city of Thebes: but even the latter, magnificent as they are, and evidencing a degree of excellence in finish not to be surpassed in modern times, sink into comparative insignificence before the architectural monuments of the eastern peninsula. Many of these architectural remains, in addition to the stately and primitive grandeur of the Egyptians, exhibit in an apparent exuberance of ornament an exquisitely classic style, a mathematical exactitude not to be surpassed by Greece or Rome, and a finish of sculpture and grouping of character evidencing a prior and extensive acquaintance with the arts, at a period, too, placed beyond the records of man.

Antiquarians have surmised that the Egyptians were unacquainted with the use of iron because no iron implements have been found in the ruins of tombs, temples, and palaces; but the now deserted quarries, and many of the existing monuments, exhibit marks which could only have been impressed upon them by iron, and we have it on historical record that iron was one of the earliest discoveries of man when he entered into the social state. On the other hand, iron is the least durable of all the metals, and particularly so in the arid climate of Upper Egypt, where it oxidates rapidly, and disappears.

I have hitherto spoken almost exclusively of granite, a term which embraces a vast variety of rocks as it passes by transition into all other known species, and is endlessly diversified in composition and character; its colour is generally more or less reddish, which is the prevalent colour of the felspar, usually its predominant part. Sometimes the felspar is greyish or yellowish white, approaching to the appearance of quartz, and only distinguishable from it by its peculiar fracture and lustre. Geologists have observed that the red colour appears more frequently in the newer, while the greyish white appears to be more characteristic of the older formation of granite, but these distinctions are arbitrary and without foundation; the colour depending entirely upon the nature of its components and upon local influence: in Nubia granites present an endless diversity of composition, and every shade of colour, from the black or greenish black sienuites to the milk-white quartz. Those kinds which contain a large proportion of felspar, or hornblende, and are exposed to the uninterrmitting and intense tropical action of the atmosphere, generally assume this reddish hue, but as the rock dips into the earth, so the colour gradually disappears, passing off by almost imperceptible shades to a greyish white; or should the rock be stratified, the change is sometimes sudden. The same conditions under which it is formed govern also its crystalline texture and hardness, the rock in those regions where it is generated, being always harder and more compact above, than it is below the surface, although all the numerous varieties exhibited in particular localities are all contemporaneously produced.

Again, the size of the crystal varies much in granite; in some kinds we observe the ingredients equally mixed, and the grain small, and this kind is termed the porphyritic granite, a material very abundant in this country, and highly desirable for the purposes of paving and numerous appliances of machinery, grinding, &c. The Portsoy granite is a variety in which the felspar forms the greatest part of the mass, and which contains mica in small groups at great distances from each other; the quartz is disposed in such a manner, that when the rock is cut in a certain direction, it exhibits some resemblance to written characters, whence it derives its name of graphic granite.

The felspar is sometimes found in the shape of cuneform concretions, representing on their fracture a surface comparable to the paws of some animals, or to the petals of flowers; at other times the quartz, intersecting the granite throughout in large nodules, represents the form and appearance of petrified molluscs, bearing a striking similitude to some of the shell marbles; the granite of which Londonbridge is composed abounds with these nodules. The felspar of the white granites of Cornwall occurs in a completely disintegrated state; cohesion is maintained in general, but the substance is so far softened, as to yield to the knife like steatite, but upon the whole it is in a loose earthy state. In the working of a tin mine in the neighbourhood of St. Austle, the miners, laying aside the usual mode of shafts and levels, were used to quarry the granite out like freestone. In some kinds the mica assumes very peculiar forms, being in laminated plates, and irregularly disposed in bunches within the rock. The felspar of some species, as in the Cornish mines, passes by incipient decomposition into porcelain earth.

Gneiss—like granite, is composed of parts cohering together without any intermediate cement, often in the form of crystals, and sometimes alternating in layers of a slaty texture resting on granite. It is essentially the same as granite in its elementary constituents, consisting of quartz, felspar, and mica, variably blended with each other without determinate order or regularity, and uniting with these components numerous mineral beds and veins, being the most metalliferous of all the rocks.

It is the strongly expressed opinion of geologists that gneiss rocks derive their origin from the more ancient granite and other crystalline compounds, but observation does not tend to confirm this view, for many varieties of gneiss pass gradually into the state of granite, and its laminated structure and horizontal position, independent of the nature and peculiarity of its mineral beds, point rather to a modified cause, proceeding from sedimentary deposition of matter analogous to the granite beneath, but uniting with it other mixed material, which granite very often, but does not always, possess. Mr. Phillips says that as some gneiss shews evidently a degree of wearing of the edges and angles of the quartz and felspar, and much more decidedly by the laminar arrangement of the mica, and consequent minute stratification of the rock, that its materials were ready-made and crystallized when brought together, and arranged by some mechanical agent, principally influenced by gravitation,—in fact, by water. But this wearing of the edges and angles is purely imaginary, and the disposition of the mica, which is sometimes disposed in large horizontal plates, is the very reverse to being favourable to the supposition. The nature of the sedimentary deposit always determines the nature of the rock: rivers carry into the sea-sands washed from the loose beds of the earth, and the finer material of the disintegrated beds, and all these matters unite and form vast beds, covering previous deposits at the bottom of the waters, and suiting their disposition to the beds beneath; among these commingled matters there may be, and no doubt often is, the disintegrated material of rocks, but generally speaking it is the material which has not yet passed into rock, subject to the same conditions, and undergoing the same change as granite, the difference being, that gneiss is formed by continuance of deposition, modified by place and association, of the finer particles of matter, and in a similar manner to the shales, which it so resembles in structure; whereas the granites are ruder masses, thrown together as accidental circumstances may determine, the one and the other being sometimes contemporaneously produced. It is ridiculous to suppose that granite on disintegration can be thus produced, for the waste created must of necessity become united with other matters held in suspension by the waters of all running streams, and on deposition will be a bed of another nature, unless we can conceive the whole of the superficial beds of the earth to have been originally granite—but this is against reason and observation, neither can we conceive granite decomposing and recombining in its undisturbed position; nor could it, under these circumstances, assume the stratified appearance it now presents to us. It is evidently the result of sedimentary deposition, and, in common with all other sedimentary deposits, has a tendency, under favourable dispositions, to assume the form of rock, first, while in its disintegrated state, arranging its material within itself according to the laws of affinity, the force of cohesion, and mechanical combination.

Such is the order of events observed by Nature in her changes in the present era; the sedimentary deposit no sooner becomes a portion of *terra firma*, than it changes, in accordance with its nature and to the local influences to which it may be exposed. Sometimes we observe the quartz crystals first make their appearance in a rich blue unctuous marl, felspar next appears, and mica is the last to assume the crystalline structure. It is acknowledged that *fragments* of granite are most rarely discovered in it, and it is exceedingly improbable that they have ever been discovered,

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